Winning in the API Economy

Using Software and APIs to Transform your Business, Drive Revenues, Broaden Distribution and Unleash Innovation



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More information is available online at http://www.3scale.net


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“A timely, valuable API resource. Combines great real-world case studies with clear explanations to give a the reader an "API roadmap" to guide them into this rapidly changing world.”

John Musser, Founder ProgrammableWeb.com

“APIs are quickly becoming mainstream, and by 2015 they will be default for businesses in just about any business sector.

Winning in the API Economy is the guide that will introduce the newcomer to the world of APIs, quickly getting them up to speed, enabling them to not just understand the space, but empower them to effectively compete in the fast growing API economy”

Kin Lane, APIEvangelist.com

Prologue

Software is creating a new business reality—the increasing automation of processes, transactions and distribution across every industry and organization. This shift has to do not only with the use of software in particular processes, but also with exposing software interfaces to others—internal developers, partners, customers and the world at large. The result is a transformation for individual businesses that makes them radically more flexible and better able to engage with others. Further, at a global level, this trend heralds a new global business reality—the **API Economy**.

The one-two-three punch of cloud, mobile and social computing has accelerated the need to put flexible software at the core of what organizations do, and this requires APIs (Application Programming Interfaces) to universally access an organization's core systems and resources. By exposing data, business processes and other services and resources through APIs, organizations are creating compelling new business platforms. The **API Economy** represents a new—but already proven—way of doing business: flexible, powerful, on demand integration with almost any external system.

As one of the key global infrastructure companies, 3scale has access to key insights into the emergence of the API Economy and the benefits it brings.

In this book, we explore this fundamental shift from yesterday's siloed way of doing business to today's radically different world. We cover:

- *How software is impacting business.*
- *How APIs underpin much of this change.*
- *How organizations can take advantage of the API Economy and meet many of the concrete challenges they face today.*

We then provide an overview of five key business use cases that illustrate key benefits of the API Economy: mobile enablement, ecosystem growth, expanding reach, powering new business models and catalyzing internal innovation.

Is this book right for me?

This book is for any business leader who is in charge of or contributing to product and distribution strategy for their organization and who is seeking gains through efficiency and new market potential. APIs are likely to play key part in business strategy over the next few years—affecting internal and external IT strategy, product, distribution and partnership opportunities. This book provides an overview of the relevant challenges and opportunities.

Does it apply to my industry?

It almost certainly does. Software is becoming an indispensable part of almost every process, and interfaces to this software have the potential to drive a great deal of positive change.

How long will the book take to read?

About two hours, if you read it fully through.

If you want to skim the highlights, you can read just the highlighted summary boxes and the sub-section of Chapter 4 that is most relevant to you, which should take about 15 minutes.

Is it very technical?

No. This book is about the business and strategic impact of opening up your business with APIs. While we touch on some technical subjects, you don't need to be fluent in jargon, or bits-and-bytes, to understand it.

We are a non-profit organization or government agency. Is this book still relevant?

Definitely. Many of the underlying themes, such as how to reach a large audience, build sustainable systems, or drive innovation, are especially relevant to these sectors.

What other information on this topic might be available after I've read this?

In the Resources section, we provide links to some great blogs and thought-leadership pieces.

You will also find extensive information at www.3scale.net.

With Thanks

In preparing this book we were indebted to many people and owe them our deep thanks for making it much better than it would otherwise have been, especially:

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Errors and omissions are ours and ours alone—credit to reviewers who caught those that didn't make it into print.

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Chapter 1:

Software Drives Modern Business

Software has become the fabric that underlies modern business—it is automating processes, transactions and distribution, enabling organizations to radically improve the way they operate.

> **"Software is Eating the World"**
>
> **Marc Andreessen, WSJ 2011**




While software used to be exclusive to inherently digital businesses or Internet era businesses such as Amazon and Salesforce.com, it now permeates almost every industry and product:

- ***Sports clothing*** *companies such as Nike have become sports social networks, aggregating data from hundreds of thousands of users every day.*
- ***Hardware companies such as Apple*** *have seamlessly combined hardware devices with software operating systems, applications and cloud services to create a tightly integrated ecosystem.*
- ***Home appliances*** *are getting connected to Internet servers and services, so they can provide up-to-date information or allow remote configuration.*
- ***Construction companies such as Bechtel*** *have extensive monitoring and IT systems in place that enable*

them to seamlessly provide custom applications for on-site teams in harsh conditions.

While advanced software provided a competitive advantage in the previous decade, it has become **table stakes** to succeeding in the new decade, and almost every business is assessing how to improve its systems in order to compete in the new reality.

Today's technology trends of **mobile expansion, social elements in most processes** and **the accelerating shift to the cloud** are all software-driven at their core and are radically changing industries. The effects are broad and deep:

- *Internal processes are starting to be automated, the first step to becoming optimized.*
- *Processes that used to be slow are now taking place in real or near real time.*
- *An increasingly large amount of data is becoming available for making business decisions, and data quality is improving steadily.*
- *The workforce is now fully mobility-enabled.*
- *Ancillary IT functions are gaining new efficiencies.*

Disruption by Software

The most striking examples of the power of software can be found when new software-powered entrants change the status quo:

1. **Low-Cost Airlines:** In the late ’90s and early 2000’s, software enabled low-cost airlines in the United States and Europe to move direct bookings online and change the established rules of inventory management and the provision of passenger services. The new systems freed these airlines from many of the sales-channel and flexibility constraints that hindered larger incumbents.

2. **The Sharing Economy for Travel Accommodation:** Web-based systems allowed Airbnb to combine two critical factors and arrive at a profitable business: unused room inventory in the homes of individuals, and travel/host reputation via the Facebook network. These twin factors enabled the company (and many similar companies) to unlock millions of nights’ worth of accommodation inventory across the globe in the space of a few years and become market leaders in shared accommodation.

3. **App-Driven Car Services:** Uber, Lyft, Flywheel, Hailo and other similar services liberated vast, untapped capacity in taxi-like services from both professional drivers and amateurs by being the first to provide excellent user experiences to both consumers and drivers and create a flexible, brokered clearing market for the service.

4. **Video and Music:** Digital media has seen large-scale disruption, with physical distribution media (tapes, records, CDs, VHS, DVDs) and their distribution channels (physical media stores) largely replaced by digital equivalents.

5. **Books:** Software has had perhaps the most impact on books, with eBooks rapidly gaining currency, and Amazon.com and other online stores impacting not only publishers (via print-on-demand) but also distributors and authors.

6. **News:** In the late '90s, television and radio with professional journalists held sway for breaking news. However, in a little over 10 years the news landscape changed radically, now being characterized by digital direct-to-web journalists, real-time news via Twitter, and mass personalization via platforms such as Facebook. Each of these shifts have come from technologies that effectively commoditize elements of the news business.

7. **ARM Chips:** Software advantages are arguably even creeping into core hardware areas such as a computer's CPU chips. ARM Holdings, for example, competes with Intel and has secured wide dominance in the mobile device chip market by licensing its technology and allowing customization vs. always manufacturing the entire chip themselves[1].

Similar stories are being told across multiple industries, and they share a common theme: New entrants are using software to redraw the playing field or unlock massive efficiencies not available to non-software-enabled incumbents.

Software Infusing Mainstream Business

1 http://www.forbes.com/sites/haydnshaughnessy/2012/02/24/intel-vs-arm-battle-of-the-business-model/2/

This **software advantage** is not just found in Silicon Valley-style disruptor companies, but increasingly in the wider economy. Many companies are waking up to the need to invest in software to stay competitive:

- **Plant and Site Control:** Sensors and warehouse control systems can now be augmented with software to allow much more fine-grained updates and controls.
- **Separating Software from Hardware Delivery Increases Agility:** Companies can ship products to customers and augment functionality later, as software updates become available.
- **Efficient Human Systems:** Companies are adding applications and devices that enable their workforce to become more mobile.
- **Big Data Analytics and Analysis:** Many companies now aggregate information on customer buying behavior for better control over order inventory and enhanced cross-selling capabilities.
- **SAAS/Cloud-Hosted Architectures:** Organizations are also embracing cloud hosted services, enabling them to process more data more cost effectively and ensure they stay in sync with software updates.

Towards the Software Enabled Enterprise

A business strategy that successfully draws on software is clearly critical to the long-term survival and health of almost

any organization. Leading adopters with the right strategy are making inroads on the competition and gaining market share as a result.

Client Services
Field Assets
In-Product Software
Suppliers
ENTERPRISE
Resellers & Partners
Assets
Software

Figure 1: The Software Enabled Enterprise.

At a strategic level, while opportunities and risks may be clear, in practice it is often extremely difficult to roll out software across the organization and even harder to make different systems work together coherently. Organizations face many conflicting pressures and must:

- **Serve both internal and external needs:** Organizations need to make sure that resources can be managed appropriately so they fit into the overall picture of company operations. In particular, they need to deliver internal efficiencies as well as new opportunities for top-

Mobile First? SAAS? IAAS? PAAS? SOA? Multi-Channel? Becoming a Platform?

Today's IT landscape is a blur of change with little unification in sight

line growth. For example, they may need to balance the needs of a newly mobile workforce with increased external access to customer data.

- **Work towards defensible strategic advantage:** Organizations must put structures in place that leverage key company strengths and assets in a powerful and agile way. They also need to enable these assets to be put to use as fully as possible.
- **Align IT with business goals:** Organizations must ensure that the overall infrastructure of the company is streamlined to enable and process the key types of transactions the company is aiming to fulfill—be they transactions for physical goods/services or digital items.
- **Future-proof investments:** As software systems are built out, organizations need to make them modular and re-usable, to avoid large IT budget hits further down the line.
- **Find efficient, cost effective solutions:** Organizations need to keep costs under control, to avoid wiping out productivity gains with investments that have hidden costs over time.
- **Move to innovative cloud service suppliers:** Shifting cloud infrastructure often allows organizations to reduce cost and increase functionality. In doing so, however, they need to avoid fragmentation and infrastructure risks, which complicate corporate internal IT.

- **Provide increasingly real-time access:** enabling fast, on-demand access to remote facilities, supply systems and external providers, while avoiding rapid escalations in cost and complexity.

- **Enable others outside the organization to connect to, and use, the deployed software:** enabling third parties with various levels of trust to create new innovative services.

All these demands place enormous strain on infrastructure and involve multiple departments, from marketing and business development to internal operations, often appearing disconnected.

As a result, while the strategic imperative of software is obvious, execution is far from trivial. In the next chapter we cover how APIs can help structure software deployments in a new way that makes many of these challenges much easier to address.

Chapter 2:

From Software-Enabled to API-Enabled

When analyzing some of the most successful companies from the modern digital era (some of which are digital natives, and some of which are not), there is a clear trend: The true leaders distinguish themselves by creating and maintaining stable, clear interfaces to their businesses. They create *programmable* businesses:

- *Enforcing the **disciplined, internal usage of well-structured interfaces.***
- *Providing **powerful integration points.***
- *Establishing **clear strategies for partner and customer engagement.***

Specifically, they execute software strategies structured around extensive internal and external interfaces. These interfaces (known as **"Application Programming Interfaces"** or **APIs**) are the key to unlocking the power of the software itself.

Companies as diverse as eBay, *The New York Times*, Best Buy, ATT and many others

"APIs are the building blocks of the digital economy. They make existing capabilities fungible, so that it is possible to use them in new ways, quickly and easily, thereby spurring innovation and new value creation."

Laura Merling, VP Ecosystems and Solutions

AT&T, Price Waterhouse Coopers 2011




are using APIs as part of their strategies. In many cases, API usage has crossed over from one domain to the other: starting out with interfaces to structure internal systems and then later offering those to a broader public.

APIs Defined

What an API does and how it works is shown in the figure below. In the Fall of 2013, the Wikipedia entry described an **API** as code that[1]:

"Specifies how software components should interact with each other."

More specifically, a **Web API** is described as:

"A set of Hypertext Transfer Protocol (HTTP) request messages, along with a definition of the structure of response messages, which is usually in an Extensible Markup Language (XML) or JavaScript Object Notation (JSON) format."

Hence a Web API can be defined without the technical specifics as:

"An interface to a software component that can be invoked at a distance over a communications network using standards based technologies."

In this book we use "API" to mean "Web API" unless otherwise specified.

1 http://en.wikipedia.org/wiki/Application_programming_interface

Client Services
TRANSACTIONS
APIs
Field Assets
CALL HOME
CONTROL INFO
CALL HOME
GET DATA
In-Product Software
APIs
APIs
INTERNAL
Suppliers
INTEGRATE
INTEGRATE
Resellers & Partners
ENTERPRISE

Figure 2: APIs provide the glue that connects software systems within the enterprise.

APIs are essentially a **technical** construct, but they can be understood as the defining interfaces through which **business** is done.

An API can become the primary entry point for business whether it is called from a company's own website and applications or by partner or customer integrations.

Specific Technologies are a Red Herring

The rather technical definition above might suggest that APIs are yet another technical solution to be layered onto what has come before. While there are some technical reasons why API strategies are worth pursuing, an API strategy is ultimately **not about technology**. An API strategy is an

architectural approach that revolves around a particular way of thinking about interfaces. Namely:

> *"Providing self-service, one-to-many, reusable interfaces."*

In other words, it is an approach that assumes that **every software system** may one day be addressed by **multiple different, as-yet-unknown groups for unknown purposes.** The discipline of creating, documenting, evolving and managing interfaces between systems is the core of what an API-centric approach is about. From this perspective, systems are loosely coupled, allowing a component service to have a wide range of future uses.

While this appears similar to **Software Oriented Architecture (SOA)** architectures from the late '90s and early 2000's, the focus is different. In many ways APIs are an evolution of SOA, which is closer to SOA's original goals. For SOA, reusability was a mantra at the time, but in reality SOA focused primarily on **limited numbers of tight integrations** for known participants and specific use-cases. While interfaces were reusable, tight coupling in practice often meant little or no serendipitous re-use. API architectures attempt to deal with the one-to-many integration issue head on, rather than as a special case of one-to-one integrations.

As a result, while new technologies such as REST Web Services do make it easier to deploy and execute a true API Strategy, there is no inherent reason SOA/SOAP and other technologies could not be used to the same end. The primary change is the orientation in the way they are deployed.

Towards an API-Driven Business

While there is no silver bullet, a sound API strategy is helping an increasing number of businesses execute extremely successful software driven strategies.

APIs, at their core, provide two dimensions of benefit:

1. They restructure and organize **internal systems** to support innovative new projects in a uniform manner—reducing maintenance costs and increasing agility.

2. They provide new opportunities to generate **new ways to reach customers, generate revenue** and **build partnerships.**

Isn't this what SOA was supposed to deliver?

In this chapter we look primarily at the former set of benefits, and we cover the second set in Chapters 3 and 4.

From an internal perspective, APIs provide the following benefits:

- **Reduced complexity:** APIs can provide a common root for transactions to flow from, wherever they may originate (mobile applications, partners, customer integrations, the customer's own website or even physical devices), all mapped into unified internal systems.

- **Improved change management:** Since user interfaces are added or changed frequently across a company, APIs provide a way to stabilize core transaction services, for a much more solid platform that enables rapid iteration at the edge.

- **New opportunities:** Custom integrations are costly to establish and maintain, inhibiting change. The lower cost of APIs allows greater experimentation and internal innovation.

- **Controlled access to close partners and contractors:** In many cases, businesses need to work with external contractors for new functionality or distribution (such as in the rollout of a new iPhone app or syndicated content). With API-supported collaboration, both parties have a clearly defined foundation for partnership, reducing both the security risk and the risk of project failure.

Amazon's CEO Jeff Bezos famously issued a stern warning in 2003 to all of the company's internal software teams, that every single service and system within the company had to be made accessible only by a well-documented API (more detail on this in Chapter 4). This edict is often credited with Amazon's later ability to create new opportunities by exposing previously internal processes. It is also worth noting that he made no statement on the technology to be used or that the same technologies needed to be used—just that interfaces be well documented and made available in a way that facilitated change management.

Ultimately, a well-executed, internal API policy provides benefits for both the group exposing systems and for the wider organization.

For the group exposing the functionality:

- *An API defines the functionality and serves as a contract by which others can work with the system.*

- *The functionality exposed via the API can be promoted*

as a service to the rest of the company.

- *The API abstracts internal implementation, allowing the team to change internal behavior long after integrations have taken place, without breaking implementations.*

At the level of the organization, the APIs provide:

- *A fine-grained overview of the available systems in the organization and instructions on how to address them.*
- *The opportunity to manage access rights and permissions to different assets.*
- *A more uniform path to success for developers working on new applications, since they no longer require knowledge of a wide range of technology stacks.*

"API Enabled" underpins "Software Enabled"

Strategies for software enabling the enterprise vary widely by sector and organization, depending on the processes in play, markets to reach and other factors. However, using APIs as a common layer across all internal and external facing business systems can have a radical effect in unifying software strategy across the organization.

As internal IT projects begin to be recast in an API-centric light, they immediately seem less complex and more impactful:

	Yesterday's Enterprise	The API Driven Enterprise
Mobile	Mobile applications for specific platforms, each with a separate code base and ad-hoc server back end.	A single backend API, addressable from clients on any platform and a succession of different front-end clients.
Customer Integration	One-to-one custom integrations at a high cost, using rigid point-to-point integration technologies such as SOA.	Provision of multi-use API services, which customers and partners can integrate on a self-serve basis for adaptation to their individual use cases.
Digital Distribution Channels	Limited choice among automated advertising style channels and expensive, custom integrations with each partner. Limited opportunity to reach new audiences.	Provision of content and transactions via well-structured APIs, often with software development kits (SDKs) added to speed partner integration of the content or transactions.
Direct Access to Infrastructure	High capacity infrastructure is accessible only internally within the company through restricted interfaces.	APIs are used to open up core infrastructure directly for use by outsiders, so it can be turned into a key business. Amazon has done this with its Elastic Compute Cloud and companies like Twilio do this with cloud communications.

	Yesterday's Enterprise	The API Driven Enterprise
Internal Development	Direct to database and backend systems applications across multiple departments, creating fragile interdependencies, security issues and slow-moving innovation.	Insertion of a uniform API layer to abstract access to backend services from new applications, creating a more modular, flexible, and well-documented application development environment.

Even if the benefits of an API were only applied to the support of internal interactions in the organization and the organization's own digital application and device strategy, the benefits would be significant.

However, as we will see in the next chapter, as APIs are opened up to a wider audience, they offer even greater potential benefits, providing support for an organization's overall market strategy.

Chapter 3:

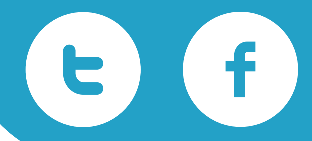
Going Beyond Internal Use —Joining the API Economy

APIs clearly provide the means to improve internal software development and rollout.

However, they provide an even wider ranging benefit: enabling an organization to create powerful new external partnership, distribution and transaction channels.

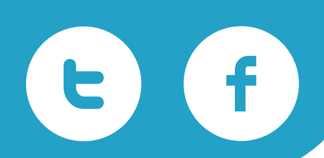
APIs can transform businesses into powerful platforms that support not just internal developers, but also partners, customers and the wider world. The organizations that seize this opportunity are joining the **API Economy.** In so doing, these organizations:

Netflix supports over 800 different partner hardware devices for content delivery via its APIs.



- *Enable flexible APIs as a major channel into their business, enabling transactions to be driven from anywhere.*
- *Provide mobile, web and other client interfaces as a flexible layer of channels on top of this API.*
- *Allow customers to integrate directly to core systems, providing more value and creating a strong provider-customer relationship.*

Expedia generates more than $4B a year via its API-powered affiliate network.



- *Grow strong ecosystems of partners that repurpose, resell and re-bundle assets to reach new audiences that the original organization could never have reached alone.*

Ultimately these changes mean organizations become **platforms** in the truest sense: providing their core value to customers and partners in the form these entities need it.

Many organizations have led the way with this type of success:

- ***eBay*** *has a vast ecosystem of power-seller and re-seller tools that drives* ***over 60%*** *of its listings.*

- ***Expedia*** *generates more than* ***$4 billion*** *of revenue from its huge global network comprised of tens of thousands of large and small partners.*

- ***NPR*** *powers hundreds of affiliate radio stations content listings via its widely used API.*

- ***Paypal:*** *processed over $14 billion in payment transactions in 2012 and expects to reach $20 billion in 2013.*

Paypal's releases on X.com show their clear aim to provide payment capabilities to a wide range of physical devices.




And many new companies are picking up the thread:

- **Nike:** The global sports clothing brand branched out into wearable electronic devices in 2008 with its tracking pod and then quickly added its Nike+ online community sports tools. With the buildout of its APIs, Nike is moving quickly

to create a robust ecosystem of partner applications around its platform—the company is going as far as running an innovation campus for new applications in partnership with the Techstars Startup Accelerator[1].

- **GM:** General Motors' API provides in-car data access for certified applications that run on its in-car platform as well as remote access APIs that enable smartphone applications to control multiple vehicle functions[2].

- **Belkin:** Like GM's innovations, Belkin's new WeMo in-home automation devices also show an emphasis on controllability for the consumer household. Connected devices include light switches, power sockets, motion detectors and baby monitors[3].

- **Johnson Controls (JCI)** launched APIs in 2011 enabling its building division to extract building management data and make it accessible for new generations of mobile applications. With the launch, the Johnson Controls Panoptix division also launched a marketplace for third-party apps, which enables partners to market to JCI's global customer base[4].

- **Campbell's Soup** recently launched new APIs that enable third-party cooking and home sites to tap into the company's recipe and nutrition content.

These companies are taking the lead by unifying the interfaces to their existing and new businesses in a manner that allows both their internal teams and external partners to add new layers of functionality.

1 http://nikeaccelerator.com/
2 https://developer.gm.com/
3 http://www.belkin.com/us/wemo-switch
4 https://whatspossible.johnsoncontrols.com/docs/DOC-2194

The API Economy Defined

These ecosystem benefits accrue to individual companies and make them highly competitive in the market. However, they also greatly enrich the global economy.

APIs represent the ability of an organization to transact digitally with anybody in a programmatic manner—APIs enable other parties to write software code that accesses data, controls remote resources and drives transactions.

We define the **"API Economy"** as:

The emerging economic effects enabled by companies, governments, non-profits and individuals using APIs to provide direct programmable access to their systems and processes.

The opening of APIs typically enables organizations to innovate more rapidly and provide uniform data and transaction interfaces to internal and external developers, partners and customers, for improved data access and transactions.

Such organizations can also develop software applications to access these APIs to create new functionality and value both for themselves and the wider world. The resulting economy enables many new classes of applications with the potential to transform the way business is done.

This economy is not separate from the overall global economy, but represents a growing slice of the global economic pie:

- ***Mobile** and **cloud** in particular are pushing increasing amounts of economic transactions from the existing HTML web over to API-driven interactions, even as both continue to grow.*
- ***B2B supplier relationships** in the form of APIs are also*

accelerating rapidly, replacing human web-based flows or even older fax/phone-based procurement models.

- ***Multi-channel plays** in retail, content and other sectors are all tending towards API-style implementations with many interface points feeding a single transaction process.*

For this reason, it is best not to imagine that joining the API Economy would be similar to joining a new economic system. Rather, think of it as maximizing your growth potential in what is likely to become the most important component of the economy.

It is also important to note that we consider the word "economy" in its broadest sense, and there need not be money changing hands during interactions. An economy in this general sense is a system for generating value that includes non-profit, government, free and other actors as well as business entities. Each of these provides and consumes service to reach their goals.

Joining the API Economy

The majority of organizations today remain closed silos when it comes to interacting with partners, third parties or even customers, in any programmatic way. In other words, business transactions take place primarily by human mediated means:

- *In physical stores.*

- *By phone.*

- *By fax.*

- *By humans clicking on an HTML website.*

At best, transactions are processed on other digital systems controlled by the company—the company's own mobile applications or physical products. While these are all valid transaction models and will continue to be so, opening up APIs to partners, third parties and customers increases the opportunity for new transactions:

- *Partners can augment the company's own offering.*

- *Partners can act as distribution channels.*

- *Customers integrating efficiently with software can drive much higher transaction volumes.*

- *Third parties out of the inner circle can find innovative uses of data and service to promote the brand or drive new customers.*

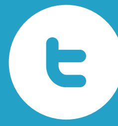
In this sense, joining the API Economy means transforming some of these internal, private interfaces to more public facing use.

"Open" Means "As Open as You'd Like"

Many people assume that API usage involves the opening of a public developer community with access for all, which is not always appropriate for every business. This

An estimated 90% of APIs are not public.

Estimates by 3scale and Craig Burton, Burtonian.






scenario, however, represents only a small fraction of the APIs in use—many APIs are successfully used solely within the company creating them or with limited sets of close partners.

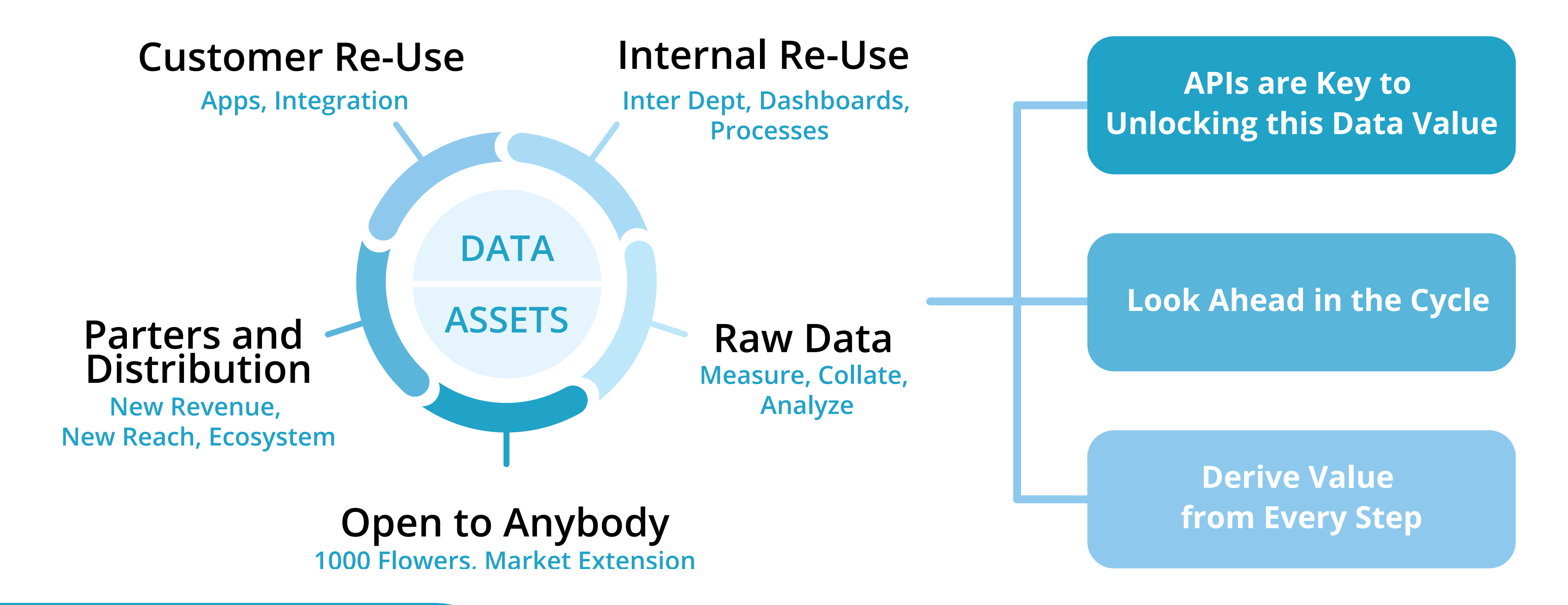


Figure 3: Different degrees of openness apply at different stages of the business lifecycle and there are benefits at every step.

As shown in the figure, the use cases for an API are many and varied. Often, organizations follow a logical path around this cycle: They first structure internal data, then enable cross departmental use, then customers, then partners and sometimes the world at large. APIs therefore serve different needs at each step in the cycle.

The value to the company also changes through the cycle:

- **Raw Data:** While this may seem like a simple use case, many organizations struggle to extract information from the myriad of systems they have deployed. APIs enable organizations to add a more flexible, accessible interface to such data sources—an interface that's ready for processing and generating insight.

- **Internal Re-Use:** As companies grow, inter-departmental data access often becomes a hornets' nest of political and infrastructural complexity. APIs help to speed up integrations for improved provider agility and innovation.

- **Customers:** APIs provide a way for customers to integrate more deeply with the company. This helps companies to increase their level of product utility, and it also decreases the likelihood of customers moving to another provider. API-based customer integrations can also be a major revenue driver.

- **Partners:** API-based partner integrations can drive reach by establishing new distribution channels and extending brand awareness through co-marketing efforts.

- **Open Developer Communities:** Such programs drive PR and buzz, and it can also crowd-source innovation, unleashing new use cases that would have been unimaginable for internal teams.

Moving from a Channel/Product-Centric View to an API-Centric View

Organizations are typically driven by questions that have little to do with technology per se, but rather with issues that ultimately drive business metrics:

- *Where do customers come from?*
- *How do they engage?*
- *How do they experience products and services?*

- *How do they "level up," get more benefit and build long-term loyalty?*
- *Which of our customers are successful and why?*
- *How do we reach customers and prospects in new and diverse places?*
- *How do we reduce both the cost of bringing new products to market as well as the cost of selling our existing products?*
- *How do we reduce cost of internal systems, yet retain control?*

These questions are centered on challenges that are commonly seen in a **channel/product-centric view:** Analyzing an organization's individual product offerings with an eye towards optimizing their benefits.

The **API-centric view** of these challenges must answer the same questions, but it flips the discussion around to ask:

- *What are our core strategic business assets?*
- *What interfaces should they have?*
- *How do we drive transactions to them?*

Once these questions are answered, the organization can consider what other interfaces, applications and distribution channels can be layered on top of these core interfaces.

In the next chapter, we'll provide five concrete examples of how an API-centric approach can yield significant rewards.

Chapter 4:

Five Business Areas where APIs drive Success

As an API infrastructure company, at 3scale we see a wide variety of use cases for APIs. In this chapter, we'll cover some of the most common business cases of our customers and others. In many cases companies have more than one need or may evolve from one to another.

1. Mobile Enablement

First generation mobile applications typically offered functionality that was limited to the operation of the device itself: making calls, sending messages and storing modest amounts of data in local memory. Applications soon began to provide more utility and a richer experience by calling out to backend services for added content and transaction functionality.

As mobile applications evolved, they are now generally available in multiple versions for multiple operating systems and devices—Android, iOS, Windows Phone or even next-generation non-mobile devices such as Smart TVs. This increases audience reach but also significantly increases management complexity.

In 2008, it was discovered that Domino's Pizza's Tivo App made calls to an unsecured server side API that allowed developers to order Pizza from the command line—an unexpected new sales channel[1].

1 http://hackedgadgets.com/2008/06/09/order-dominos-pizza-via-command-line/
& http://lifehacker.com/388708/track-your-dominos-pizza-order-from-a-terminal

In many cases, the backend APIs serving applications are custom data sources tailored to each application and little thought is given to the fact that the backend service may be accidentally accessible to parties other than the planned mobile applications. The Programmable Web directory frequently documents such unofficial APIs. In many cases these “Dark APIs” are of limited value in terms of re-use and create significant security risks for the organization that provides the application.

A further challenge is that mobile application development teams often struggle to ship applications on time when they depend on internal company data:

The development of an externally accessible data source often holds up app rollout for months.

The project may be ready to go, but access to the necessary data or transaction functionality on the back end has not been green-lighted or provided.

Taking an **API-centric** rather than a **channel/product-centric** (in this case **application-centric**) approach to a mobile strategy addresses these issues directly. Specifically, this means treating the API as a first-class citizen in the design of one or more mobile applications:

Advice for APIs that Drive Mobile

- Stay standards based.
- Use JSON payloads.
- Make the API a first class citizen.
- Don’t assume the APIs cannot be found and exploited.

The backend API must be defined as the baseline platform for all of an organization's mobile applications.

If organizations define the backend API as such, they create a stable abstraction layer between internal resources and a changing set of external applications. As a result, this architecture:

- *Provides a stable backend baseline for multiple applications on different device types.*
- *Fosters agility for the development of new applications.*
- *Creates a natural boundary to the edge of the organization, which is critical when the organization partners with external design or development agencies.*

Companies that have gained tremendous success in taking an API-centric approach to mobile include: ***Twitter***, feeding an early explosion of clients; ***Starbucks***, feeding location data to mobile apps on multiple platforms; and ***NYC.gov***, powering its 311 applications via APIs to name but a few.

Key API traits for mobile enablement:

Technology	Description	Benefit
JSON	Javascript friendly data format to fit cleanly with HTML5 mobile applications.	More data-efficient than XML and easier to manipulate for client code.
Single Page Architecture Frameworks	A new technique for building web based applications which align more directly with app development paradigms.	Greater alignment between web and app development frameworks, which increases shared tooling.
oAuth	Authentication protocol providing secure login for mobile applications without sharing username/password combinations with applications.	Widely used standard that helps developers with available libraries and best practices.

2. Customer and Partner Ecosystem Growth

Mobile enablement is one example of how APIs can provide access to content and services in new ways. In many ways mobile is a facet of a more general trend of delivering services to multiple interfaces for different uses.

A common challenge for organizations is to serve special needs that vary on a customer-by-customer basis. In enterprise scenarios this has typically led to staffing up significant post sales engineering teams to provide on-premise customization and installation. In others, it can make products hard to sell versus in-house builds, in still others, companies simply cannot tackle certain market niches since they are not profitable enough to serve.

It is not surprising then that "becoming a platform" is a key objective for many companies. "Platformization" in this sense means:

- *Exposing key sets of content or transactional capability in a programmable way such that customers or third parties can create long running integrations on top of the functionality.*

- *Providing support for these integrations and related business engagements.*

- *Helping to promote particular partner integrations to benefit uptake by the customer base.*

A platform essentially creates an arena in which others can create value, either directly for themselves (customer platforms typically) or for others (partner platforms).

Great examples of organizations that have achieved breakthroughs as platforms include Salesforce.com, Box.com and Amazon.com.

There are three broad audiences for which an organization can open itself up as a platform:

- **Customers:** Exposing programmatic functionality to customers is particularly common for SAAS companies and has multiple benefits: First, it enables customers to increase the value they derive from the service to suit their own needs more closely. Second, tighter integrations encourage customers to drive more transactions through the systems, often increasing revenues. Third, integrations by customers represent significant efforts, reducing the likelihood that they would switch vendors. Lastly, platform access is often an upsell driver (for example, Salesforce API access is only permitted for Enterprise level contracts).

- **Reseller Partners:** Exposing functionality in ways that allow third parties to re-package functionality and deliver it to new audiences is covered in more detail in the next sections. However, it is one of the most common ways to view platforms. The platform tools allow such partners to create specialized versions of the service for new audiences and market these separately.

- **Integrators and Software Partners:** Rather than replicating functionality, a third type of platform user is one that augments the functionality of the original product, either by providing new software applications (such as Salesforce's Application Ecosystem) or by providing connectors to their own services (e.g. see partner marketplaces such as those run by Zendesk and Atlassian—the apps are often bridges to other systems).

In each case, the platform enables the creative use of existing core systems to enhance product value and benefits the business by adding new functionality, reducing churn and driving higher transaction volumes.

Platforms are also naturally powerful in growing market share—they provide a practically unstoppable ecosystem advantage, in which:

- *New partners flock to the largest ecosystem in the sector.*
- *Knowledge of how to use the platform builds up in the development community.*
- *The platform matures as more and more use-cases are covered.*

Business Benefits of Platforms

- Grow functionality without writing code.
- Cross-connect with complimentary solutions.
- Enhance value for customers.
- Increase stickiness.
- Grow reach.

While platform thinking is beginning to become commonplace among pure technology companies, it is also beginning to take hold in many other sectors, as mentioned in the previous section.

Recommendations for Platform APIs

- Provision tiers of usage
- Consider tying to your existing pricing structure.
- Determine which types of customers and partners you expect to engage with the API and what use-cases you plan to serve.
- Ensure stable terms of service—make sure the business model is a win-win for partners.
- If launching a partner API, give visibility to partners to help them succeed.

3. Developing Massive Reach for Transactions and Content

One of the areas in which platform thinking has been most immediately valuable, and deserves its own category, is in powering distribution.

The notion of a digital sales channel used to be tied to companies having and managing a web presence, an HTML destination site

at which customers could browse product information (be it content, media, services or physical goods) and engage in purchasing transactions. Mobile then added another channel that needed to be managed—often in an entirely different way that an organization's existing properties are managed.

In the new API economy, however, this thinking is outdated, and there are more opportunities for distribution than ever before. A multi-channel distribution channel is now clearly the strategy to pursue.

Building APIs that accelerate reach fall into two broad categories, depending on the type of product involved:

- **Content and Data:** Content and media businesses are continually seeking new ways to reach their audiences. While a company's own web property and mobile applications may provide the primary means to reach audiences, in the API Economy this is no longer enough: Consumers expect content to be available whenever and wherever they need it, and companies that become adept at delivering this have a powerful advantage, be this on new hardware devices or through partner channels or aggregators.

- **Transactions:** Providing inventory and transaction capabilities in a programmatic way and using both to drive transactions is a powerful strategy for businesses, and it can also be beneficial to brick-and-mortar retailers. Since business success is strongly correlated with transaction volume, APIs can enable increasingly powerful affiliate models to drive businesses, or even more radically, wholly self-sufficient third party resellers.

To fully illustrate the use case of improving the reach for content and transactions, we'll next describe each of the two categories in detail.

Improving Reach: Content and Data

Destination websites still play a huge role in delivering discrete packages of media, content and data. Increasingly however, they are also delivering composites of content, media and data, drawn from multiple sources before being aggregated into the final product. Such aggregation includes:

- *Transforming raw statistical data into visualizations.*
- *Embedding photos, videos and other media into blog posts.*
- *Providing real-time rankings and social-media scores alongside the primary content.*

Business Benefits of API Powered Distribution

- Low cost partner integration
- Reach niche channels quickly
- Place familiar branded content and purchase opportunities wherever customers wish to access them
- Use context to add value to the customer and your business

This aggregation trend is strongest on mobile devices, as users use fewer applications daily and spend more time in each—driving these widely used applications to increasingly act as hubs for content and transactions. It is also present in the enterprise, when valuable business data from sources such as Bloomberg or Dun & Bradstreet is integrated directly into executive dashboards or CRM systems such as

Salesforce, no longer requiring users to switch screens and view the information on a separately branded page.

It is crucial, then, for content companies to develop an effective API strategy to ensure they reach their audiences whenever and wherever they are needed. The following examples represent different dimensions of this capability:

Reaching a Galaxy of Hardware Devices: Netflix's well-known API program serves up diverse user experiences on over a thousand different hardware devices, providing metadata for content browsing and selection as well as streaming the resulting content. Such diversity means convenience and value for its customers and a large barrier to entry for new entrants in the space.

Content APIs vs. RSS

RSS for a long time provided a useful aggregation and syndication solution. It is however strictly limited to fixed feeds of content. APIs provide much more potential since they can be queried to select precise subsets of content, or filter or return historical data.

Syndicating Content: Pure content companies such as IGN have very active destination sites, yet they also wish to provide content to their audiences via aggregator services that they use everyday, such as Flipboard. APIs enable Flipboard to pull information from multiple data sources and serve them up in curated form. Content channels without APIs risk being cut out of these aggregator tools and losing access to part of their audience.

Putting Content in Context: The UK's Guardian newspaper's API[2] allows third-party blogs to syndicate chosen content from the Guardian and place this on other sites. In exchange, the third party must split advertising proceeds with the newspaper. Taken to the extreme, this strategy could enable content

2 http://www.theguardian.com/open-platform



to reach new audiences and enable not only more readers to discover it but also more targeted advertising. An article about the Manchester United football club on a Manchester United fan site has potentially even higher advertising value per reader than The Guardian's own pages.

Content platform companies such as Spotify and RDIO serve as another API-centric content business model. These companies serve data (in the case of Spotify, its core product—music) from central server locations, and rely on APIs to deliver both the metadata and the stream to a variety of freely downloadable clients on many platforms.

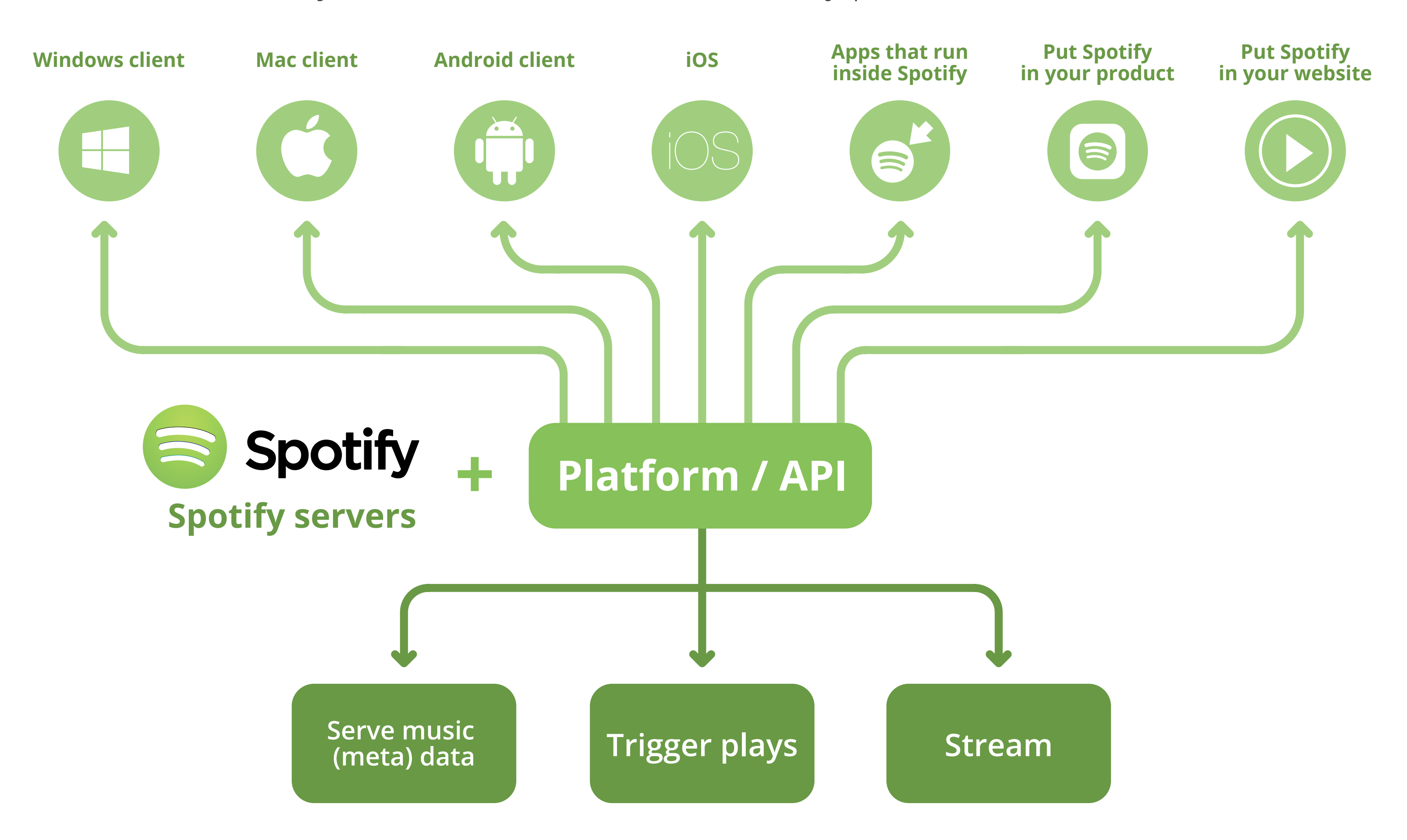


Figure 4: Spotify's platform underpins all of its channels to market and powers a key part of its own product.

By adopting this strategy, these companies can take advantage of the reach of large mobile platforms such as Android and Google, without being subject to fees from the relevant app stores. The software is free to download, so neither Google nor

Apple takes a cut, but Spotify monetizes its service through paid subscriptions.

Improving Reach: Transactions and Commerce

Amazon.com provides us with one of the most developed examples of an API-powered purchasing ecosystem. Although most buyers are familiar with the company's main web property, they may not be aware that the company drives large volumes from a sophisticated API and affiliate program.



Figure 5: Amazon's APIs create an entire ecosystem of reseller capabilities and channels to Market—from its own applications to a small industry of businesses that create out-of-the-box affiliate sites for a fee.

The company reaches consumers via its own brand but also puts transaction power in the hands of thousands of resellers:

- *APIs enable third parties to pull inventory, pricing and description information, as well as ratings and much more.*

- *This, in turn, enables resellers to build sophisticated new niche shop fronts.*

- *Sales are subsequently tracked via affiliate links that attribute the sale and result in revenue share payments to the third parties.*

- *Other partners can embed simple product search or purchasing links in their sites, whose main purpose is not to sell but to engage a specific type of audience. The API allows the powerful, flexible selection of the product listing that results in the best fit for the niche audience.*

Expedia takes this even further, effectively allowing the creation of whole white-labeled travel portal solutions within large companies. Through this strategy, Expedia directly targets the corporate travel market.

The APIs operated by Amazon and others also act as clear enablers for the multi-channel sales strategy, making it possible to have presence on many different devices and creating the widest possible range of buying experiences.

Though digital native companies pioneered this model, global brands are also waking up to the opportunity for driving user engagement and transactions through digital means. Two excellent examples are:

- **Walgreens:** launching APIs for 3rd party photo printing and prescription refills that can now drive transactions to over 8,000 Walgreens stores based in the United States.

- **Best Buy:** enabling third parties to use its BBYOPEN program to write applications that access store, product and price information and even create third party transactional shopping experiences[3].

Such programs offer three levels of functionality, with increasing payoff:

1. **Catalog and Content sharing:** These APIs enable third parties to access product information, and potentially other valuable content, for integration into their existing systems. While these are helpful for brand awareness, they typically don't provide a powerful enough incentive for third parties to integrate them. This is why companies should at least step up to the next level, if not the third.

2. **API-Driven Affiliate Programs:** In these cases, the catalog and content information comes with the ability to embed affiliate links and codes along with content as it is served out to a third party's audience. This closes a revenue loop for the third parties involved, enabling them to be remunerated for showing the content. The retailer can also typically see very clearly not only which partners are generating traffic, but also those that result in new closed sales.

3. **Transaction Drivers and Micro Sites:** These APIs offer the most sophisticated example of transaction-enablement. (Expedia's APIs fall into this category). Such

The Golden Rules of API-Driven Commerce:

- Close the value loop for partners—ensure they have an incentive to integrate.
- Select and qualify partners—particularly those who are permitted to drive transactions.
- Target partners that can provide reach into contexts in which your buyers expect to find you.

3 https://bbyopen.com/developer

APIs enable full transaction capability so they enable third parties to create and execute transactions on their own sites, extending storefronts to many properties all over the web.

As more and more retailers pursue this strategy, consumers are likely to expect this capability to be available across many categories. Companies that offer such solutions early will likely become preferred platforms for many partners with access to large buyer audiences.

4. Powering New Business Models

Although many API use cases involve feeding and extending existing business models, some are focused on the creation of entirely new business opportunities or even the establishment of new primary channels. A new API may even become the primary product for a company or one of its divisions. Consider these two examples:

- **Google Maps:** While many users experience Google Maps on one of Google's own properties, it is also by far one of the most widely used embedded APIs, which adds Maps to a wide range of third-party sites and applications. Although Maps are free to use for the end user, and though the API is also free up to a certain number of users, Google does charge for usage above this level, to recover the costs of serving the heavy traffic loads.

- **Twilio:** Twilio is one of the leading companies worldwide in programmable communications infrastructure. The company's well known API makes it simple to set up voice calls, send SMS messages and carry out complex call management tasks using just a few API calls. The company

is widely praised as having developed one of the most user-friendly API experiences.

The business model in both of these examples is directly tied to the number of calls on their APIs, the number of results returned or other metrics directly related to API traffic. Organizations use such metrics in contracts, and they are tied directly to billing.

In each case, the API is essential to the business model. Each API call (an SMS sent, a map tile served), is closely correlated with calls to the service and value to users.

In many cases, an API-driven business model may emerge as a by-product of other activity. For example, Flightstats developed a powerful set of web and mobile applications with 95% global coverage in terms of airline arrival data. As a result, new opportunities arose on the B2B side of their business—providing bulk data to large organizations—a service for which Flightstats now charges volume-based fees.

The value of an API-centric strategy for such businesses is very obvious—access to the API is the central asset that is being made available in the marketplace. Furthermore, as with platform strategies, economies of scale clearly apply:

As more developers adopt an API, knowledge and tooling grow and recommendations follow, driving broad adoption.

For organizations that apply API-centric strategies, we typically see three levels of support for facilitating take-up

and adoption. Each, in its own way, aims to simplify API adoption as much as possible:

- **Site Documentation:** A well-documented API, which clearly explains which methods are available and how to use them, is a must to promote uptake. Modern APIs are also now typically rolling out interactive documentation, which allows developers to test calls from a web page without having to write any code.

- **Code Samples and SDKs:** In addition to the documentation itself, code samples are one of the most important items developers ask for when beginning to use an API. For more complex APIs, typically successful companies go further and develop full-blown software development kits (SDKs) and re-usable libraries for key software stacks that their target audience uses often.

- **Platform/Tool Integration:** The third level in integration support is to go even further than SDKs and provide code-specific modules and plugins for development platforms that the target developer audience uses. For mobile apps, this may include entries in marketplaces such as the Appcelerator Plugin Marketplace, or for web apps, Heroku's Module Library. This turns API usage into a simple matter of signing up and loading the appropriate library or module.

When the API is your core business, your business may live and die by the quality of its user experience. Excellent documentation also saves support effort and speeds the time it takes customers to go live.

Within the sphere of APIs that act as direct business drivers, organizations can apply a wide range of business models:

Model	Description
Fixed Cost-Per-Month and Tiered Rate Pricing.	Different levels of access based on tiers of fixed cost-per-month and providing varying numbers of transactions per month.
Fixed Cost-Per-Month Tiered Volume Rate Pricing With Overages.	The same as the previous model, but allowing price overages when an account is above quota.
Data Quality Based Tiered Pricing.	Providing different types of return data (richer vs. simpler) for different subscription fees.
Credit-Based Systems.	Up-front purchase of a certain number of usage credits which are then “burned down” by calls made on the API or other events.

5. Driving Internal Innovation

Up until now, we have provided examples of external-facing APIs, and we described how to use such APIs to build strong partner ecosystems and drive new business. Arguably, however, the most immediately accessible opportunity for many businesses is an internal use case for APIs.

The Business Benefits of Internal APIs

- Accelerate projects
- Create a safety layer around key assets
- Create a structure that supports the engagement of external contracts
- Achieve greater agility and maintainability

Companies manage collections of important internal systems, all of which mesh in complex ways to deliver products and services. As an organization grows, these systems change, get repurposed, and, if they are well managed, they can become key assets in delivering ever more innovative services. Unfortunately however, the development of new products, services, and processes is often carried out in a manner that weaves a complex web of inter-dependencies across legacy systems. This, potentially:

Slows down innovation significantly. In some cases, it simply rules out new projects.

Greatly complicates maintenance, since the layers of dependencies often need to be worked out prior to regular maintenance activities.

Forces a significant amount of refactoring on teams tasked with creating new systems.

Actively defining the nature of the interfaces to different internal systems, departments and processes creates an environment that is **ready for change and innovation.**

Amazon serves as one of the most extreme examples of this phenomenon. In 2011, **Google Engineer Steven Ygge,** who had previously worked at Amazon, accidentally posted a Google internal memo he had written comparing Google's internal systems approach to that practiced by Amazon. In

the text he describes a companywide Amazon[4] policy set by Jeff Bezos in 2003. The policy read:

1) All teams will henceforth expose their data and functionality through service interfaces.

2) Teams must communicate with each other through these interfaces.

3) There will be no other form of interprocess communication allowed: no direct linking, no direct reads of another team's data store, no shared-memory model, no back-doors whatsoever. The only communication allowed is via service interface calls over the network.

4) It doesn't matter what technology they use. HTTP, Corba, Pubsub, custom protocols—doesn't matter. Bezos doesn't care.

5) All service interfaces, without exception, must be designed from the ground up to be externalizable. That is to say, the team must plan and design to be able to expose the interface to developers in the outside world. No exceptions.

6) Anyone who doesn't do this will be fired.

The policy was rigorously enforced, and as with any organization that imposes something similar, no doubt it initially negatively impacted some projects and seemingly put obstacles in the way of progress. This short-to-mid-term pain, however, likely set Amazon up for some remarkable gains that it continues to enjoy today:

4 A link to the post, as well as analysis, can be found here: http://apievangelist.com/2012/01/12/the-secret-to-amazons-success-internal-apis/

- *The ability to open up entire parts of its business to create new revenue streams (such as Amazon Web Services or its fulfillment services).*

- *The ability for everyone to instantly understand, by looking at exposed interfaces, what each department and process offers.*

- *The ability to steadily pursue interface developments and evolution over time, rather than being trapped by legacy systems that cannot easily evolve.*

While many organizations may not go as far as Amazon did at that time, the value of exposing internal interactions as APIs becomes very clear as soon as new projects need to be executed—the resources are immediately obvious, and the information on how to integrate is accessible along with the information describing the path to obtaining permissions or credentials.

Many organizations, in many sectors, are now taking this path:

- **Bechtel:** One of the world's largest construction companies, Bechtel makes extensive use of internal APIs to power customer applications used by field operations teams. The APIs allow in-house mobile teams to craft and evolve new applications quickly, for a strong advantage in agility.

- **GM and other car manufacturers:** Such companies are gradually opening up internal car information in the form of APIs to enable quicker internal work on custom applications that enhance the car ownership and driving experience.

- **SITA Labs:** An airline consortium laboratory that creates new solutions, SITA Labs is developing API solutions for a wide variety of airline IT needs[5].

- **UC Berkeley:** The university's campus IT services department is recasting its internal IT infrastructure using APIs, so it can more easily create new applications. In many cases, the university is allowing students to access data directly for the first time[6].

Success with API Driven Innovation

- Remember developers are your customers.
- Build up sound conventions and best practices.
- Assume that one day all these interfaces may be open.
- Target small wins in API-ification first.
- Take the long view.

In each of these examples, while some APIs may eventually see external use, their primary initial purpose is to enable more rapid internal collaboration and innovation. This structural advantage, while it is not always visible in terms of revenues, is likely to be significant.

5 http://www.sita.aero/
6 https://developer.berkeley.edu/

Chapter 5:

3scale—the API Management Service for Success in the API Economy

APIs are likely to be one of the most transformative technologies for business today. However, rolling out a successful API strategy is also a complex endeavor presenting new considerations to take into account:

- *How should different APIs be exposed and to whom?*
- *How should those services be secured?*
- *How should their usage be tracked?*
- *How are access rights managed?*
- *How do developers, partners and customers establish their identity and get provisioned for the rights they need for the API?*
- *How does an organization ensure success for the users of its APIs?*

3scale provides API management infrastructure solutions for all of these challenges and helps hundreds of customers, from Fortune 100s to small startups, to run successful API programs. The company's solutions include infrastructure for:

- **Access Control and Rate Limits:** Restricting usage of APIs to trusted parties only, and enforcing usage quotas by user, by application and on the basis of a wide variety of traffic metrics.

- **Analytics:** Tracking API usage across all applications, users, methods and exposed resources for a complete picture of activity across all exposed APIs.

- **Developer and Partner Portal:** Providing sophisticated onboarding systems for developers, partners and customers interacting with the API, with custom workflows, documentation, forums and other support, to ensure API-user success.

- **Billing and Payments:** Offering built-in utility-style billing systems and card-payment systems to enable charging for API usage, if desired.

- **Comprehensive APIs for all functionality:** Providing API access for all of 3scale's own services and hence the ultimate flexibility for integrating them with existing processes.

3scale enables core API use cases with ease:

	Key Requirements
Mobile Enablement	OpenAuth support, user rate limits, analytics, version management.

	Key Requirements
Platform Creation	Onboarding, management and communication with partners and customers, as well as seamless management of access rights.
Distribution	Supporting partner integration, tie-ins to affiliate programs and measuring diverse success metrics.
API-as-a Business	Built in billing and payment services to support a wide range of business models.
Internal Innovation	Private and semi-private API-system rollouts to restrict which audiences have access to which APIs.

More information on 3scale products and services can be found at http://www.3scale.net/.

Chapter 6:

Conclusions and Additional Resources

As software becomes increasingly important to success, APIs will play a transformative role for many organizations. The world is moving to a more networked, integrated economy in which businesses with the right interfaces to their internal systems will thrive. They will:

- *Empower their customers to do more.*
- *Build highly valuable partner ecosystems.*
- *Become increasingly more agile.*

"By 2014, 75% of the Fortune 500 will open APIs"

Source: Forrester





APIs will be the linchpin that makes these gains possible, to enable a wide range of initiatives from mobile, to integration and beyond.

As the examples in Chapter 4 show, the powerful scenarios that APIs enable are not necessarily separate: An organization may start with one and extend the API to leverage two or three additional opportunities.

For more information, visit:

http://www.3scale.net/apieconomy

and join the conversation on Twitter @3scale.

Resources and Notes

Useful Links:

- *API Strategy Conference: http://www.apistrategyconference.com/*
- *3scale Blog: http://www.3scale.net/blog/*
- *3scale API Economy: http://3scale.net/api-economy/*
- *API Evangelist: http://apievangelist.com/*
- *Programmable Web directory: http://www.programmableweb.com/*

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Glossary

- **API (Application Program Interface):** Specific mechanism used for allowing software components to logically interact with each other.

- **API Driven:** See API Enabled.

- **API Economy:** An umbrella term referring to the emerging economic effects—and its related ecosystem—enabled by companies, governments, non-profits and individuals providing direct programmable access to their systems and processes through the means of APIs (Application Programming Interfaces).

- **API Enabled Enterprise / Organization:** An organization that has deployed APIs to wrap significant proportions of its important systems in APIs and is using these APIs to drive business benefits.

- **App:** App is short for application or application software. But it often is used to refer to a mobile or tablet application. Software and programs are also sometimes referred to as apps.

- **Application:** The software program that causes a computer or device to perform a useful task or function. Also called application software.

- **Cloud Computing:** A computing model that allows application service provisioning using the Software as a Service (SaaS) model for system design. Note: it is understood that there is no commonly accepted unequivocal term for Cloud Computing. The definition

provided is the general definition referred when using the term in this document.

- **Cloud [Trend]:** Refers to the general trend of deploying and using software systems in remote locations owned and run by third parties—often on virtualized shared hardware—instead of deploying software providing similar functionality on local hardware under the control of the organization.

- **Cloud Hosted:** A piece of software deployed on and using software systems of remote locations owned and run by third parties.

- **Computing Trio:** The combined threesome of cloud computing, mobile computing and social computing that is having such a profound impact on the computing industry and the API Economy.

- **Distribution (of Content/Transaction Capability):** The act of delivering a piece of content or transaction functionality to an audience.

- **Ecosystem:** A system involving multiple (typically) many elements—each of which interacts with other elements and through complex interactions is able to generate value and survive.

- **Internal Developer:** Software developer working within a particular organization on internal code and systems.

- **Mobile [Trend] (when not qualified with a concrete term such as "Device"):** Refers to the general trend of providing access to information and system from devices that communicate using local area or wide area wireless networks.

- **Natural person:** A human being.
- **Organization:** Any business, government, non-profit or other institution that acts but is not a natural person.
- **Partner:** Organization or individual with which a mutually beneficial arrangement has been reached to provide services to each other.
- **Platform:** A structure or system designed to provide a range of generally useful functions that can be combined in various ways by its users—often in ways which had not been explicitly thought of when the platform was built.
- **Person:** A character deliberately assumed by a natural person.
- **Process:** Instance of a piece of software, hardware or human activity that is producing a functional result.
- **Resource:** A digital or physical asset that provides some kind of utility.
- **REST (Representational State Transfer):** An architectural pattern for the design of hypermedia based distributed software applications—http://en.wikipedia.org/wiki/Representational_state_transfer.
- **Serendipitous Re-use:** Unexpected but welcome new utility for an existing system which was not contemplated for the system at design time.
- **Service:** Software or human systems which responds to requests for action via some external interface—usually a software interface.

- **Service Oriented Architecture (SOA):** In this work, this term specifically refers to a software architectural pattern based running multiple components of a software system separately and making them communicate with one another using messages.

- **Siloed:** Applied to software systems, a set of systems that have hard or restrictive controls in place to prevent communication between any two such systems.

- **Single Page Architecture:** A web application design pattern in which all data and libraries are retrieved with a single page load. Subsequently the browser code uses API calls with the server to create the dynamic features in the App.

- **SOAP (Simple Object Access Protocol):** Refers to the W3C specified Software communication protocol—http://en.wikipedia.org/wiki/SOAP.

- **Social [Trend]:** Refers to the general trend of adding digital social media layers to business activities.

- **Software:** Programs that run on computing machinery to deliver a particular functional result.

- **Software As A Service (SAAS):** Refers primarily to a business model for providing functionality to third parties such that the software is hosted on the provider's infrastructure and is generally paid for on a monthly basis.

- **Software Enabled Enterprise / Organization:** An organization that has deployed software to wrap significant proportions of its hardware assets and/or

products and is using this software to drive business benefits.

- **Software Interface:** See API.
- **Software Driven:** See Software Enabled.
- **Transaction:** One or more invocations of a software interface that produces a single result.
- **User:** A natural person who is represented by a subject.
- **User-centric:** Processes that are structured so as to allow users to conceptualize, enumerate and control their relationships with other parties, including the flow of information.
- **Web API:** A set of messages, along with a definition of the structure of response messages, that enable communication with a software interface across a local or wide area network.